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0062961

05-AMRC-0012

OCT 26 2004

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Addressees:

TRANSMITTAL OF THE REMEDIAL DESIGN REPORT/REMEDIAL ACTION WORK PLAN FOR THE 100 AREA, DOE/RL-96-17, REV. 5, AND 100 AREA REMEDIAL ACTION SAMPLING AND ANALYSIS PLAN, DOE/RL-96-22, REV. 4

Enclosed for your approval is the Remedial Design Report/Remedial Action Work Plan for the 100 Area, DOE/RL-96-17, Rev. 5, and 100 Area Remedial action Sampling and Analysis Plan, DOE/RL-96-22, Rev. 4. Your submitted comments and the associated responses are also included.

The U.S. Department of Energy, Richland Operations Office (RL) met with EPA and Ecology on multiple occasions over the last several months to discuss and review proposed responses and resolve issues. These discussions resulted in reaching agreement on August 31, 2004, to submit the documents for approval. Accordingly, these documents have been revised based on the comment resolutions.

Resolution of comments have been coordinated and discussed with appropriate EPA and Ecology staff. If you have any questions, please contact me, or your staff may contact Shirley J. Olinger, Acting Assistant Manager for the River Corridor, on (509) 376-6628.

Sincerely,

for Keith A. Klein
Manager

AMRC:DCS

Enclosure

cc w/encl:
R. A. Carlson, BHI
J. W. Donnelly, BHI
D. A. Faulk, EPA
L. E. Gadbois, EPA
J. Price, Ecology
Administrative Record (100 Areas)

DOE/RL-96-17
Rev. 5
OU: N/A
TSD: N/A
ERA: N/A

APPROVAL PAGE

Title: Remedial Design Report/Remedial Action Work Plan for the 100 Area

Approval: U.S. Department of Energy, Richland Operations Office

K. A. Klein, Manager
Richland Operations Office

10/21/97
Date

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DOE/RL-96-17
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APPROVAL PAGE

Title: Remedial Design Report/Remedial Action Work Plan for the 100 Area

Approval: U.S. Environmental Protection Agency

L. E. Gadbois, Project Manager Date

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DOE/RL-96-17
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ERA: N/A

APPROVAL PAGE

Title: Remedial Design Report/Remedial Action Work Plan for the 100 Area

Approval: Washington State Department of Ecology

J. Price, Project Manager,
Environmental Restoration

Date

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DOE/RL-96-22
Rev. 4
OU: N/A
TSD: N/A
ERA: N/A

APPROVAL PAGE

Title: 100 Area Remedial Action Sampling and Analysis Plan

Approval: U.S. Department of Energy, Richland Operations Office

10/21/04

K. A. Klein, Manager
Richland Operations Office

Date

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Response to Washington State Department of Ecology Comments on 100 Area Remedial Action Sampling and Analysis Plan, dated February 2004, Revision 4, Draft B Redline

1. **Global Comment:** See the CD with Ecology copies of SAP, Appendix A, Appendix E, and Appendix F for redline-strikeout edits and embedded comments.

   Response: The CD contained a file of Ecology's comments, which are addressed herein. The comments on the CD were discussed along with the itemized comments and responses presented here. Additionally, the CD contained redline-strikeouts of Appendices A, E, and F. The edits, which consisted of grammatical changes and technical edits were accepted as appropriate. The embedded comments were part of the following comments.

2. **Comment:** Table I-1, Page I-6: The actual groundwater protection values are needed for all non-rad COCs. Also, cite the year of the WAC 173-340 regulation. See redline-strikeout changes made on Ecology copy.

   Response: Table I-1 was made consistent with Table 2-7 of the RDR/RAWP and all groundwater protection values were added. The year 1996 was added to the Table I-1 footnotes that reference WAC 173-340 regulations.

3. **Comment:** Section I.1.9.3, Page I-7: WAC 173-340-704 through-706 (1996) only specify risk assessment criteria – these sections do not specify cleanup criteria though they describe the use of Methods A-C; change "specifies" to "describes".

   Response: Comment accepted.

4. **Comment:** Table I-2, Page I-10: Cite references to support exclusion of each non-rad COPC. Also, antimony cannot be eliminated on the basis of risk assessment alone. ARARs must be satisfied. Retain antimony as a COC.

   Response: This table pertains to the radioactive liquid effluent sites, which have been remediated. It does not apply to the remaining sites. That distinction was made clear in the text. The table caption was changed to "Excluded Contaminants of Potential Concern for 100 Area Radioactive Liquid Effluent Waste Sites". Antimony was retained as a COPC.

   Note: After review of Table I-1, it was determined that silver and cadmium are COPCs and therefore were removed from the table.

5. **Comment:** Section I.5.1, age I-19: Photos of visual anomalies should be kept with the data for each site.

   Response: The field engineer has the discretion over what photographs are taken and

preserved as part of the project file.

6. **Comment:** Section I.5.2, Page I-20: Cite references that support the statement that the metals are not leachable.

   Response: The section refers to waste designation purposes only and the data is not used for closeout decisions. Testing for waste profiling and designation is done to meet the land disposal requirements of WAC 173-303, Dangerous Waste Regulations. The statement was revised as follows: "The results on 261 samples for waste designation show that these metals rarely leach at level that exceed LDR limits."

7. **Comment:** Section I.5.3, Page I-20: Eliminate "if needed" in reference to discrete sampling. This is too vague.

   Response: The sentence was amended as follows: "...if needed, for waste designation for LDR...."

8. **Comment:** Section I.5.6, Page I-21: What is the status of the 100-D-12 sodium dichromate station?

   Response: WIDS states that the 100-D-12 Sodium Dichromate Pump Station is "Interim Closed Out." 100-D-12 was remediated between November 9, 1999, and April 19, 2000, as reported in CVP-2000-00016. Cleanup verification determined that all contaminants were removed to attain direct exposure, groundwater, and Columbia River remedial action goals.

9. **Comment:** Section I.6.1, Page I-22: Cite references that describe the experience to date for focused sampling.

   Response: Section 1.6 was revised to better define the Remaining Sites Process. Additionally, Appendix G identifies which remaining sites have been closed out. The reader is referred to the closeout report for details on the sampling effort.

10. **Comment:** Project Background and Rationale Figure, Page I-23/I-24: Explain in the document how you decide need for or lack of need for confirmatory sampling. Also, add a box to the figure to explain this or modify the "is confirmatory sampling needed?" box (on left side of figure). Also in the document provide examples of "anomalies".

    Response: Section 1.6 was revised to clarify the sampling approach for the remaining sites. The text was made available for review at the June 17, 2004 meeting with the Tri-Parties.

11. **Comment:** Section I.6.3, Page I-25, 1st paragraph: Assure that the sampling procedures described in Figure I-7 are used for the remaining sites.

    Response: Section 1.6 describes the sampling approach for the remaining sites. The applicable sampling procedures are specified in Section III.

12. **Comment:** Table II-1, Page II-4: No methods for total concentrations of metals are given. These are only TCLP methods.

    (a) Provide the methods for determining total concentrations for each of the metals for cleanup decisions.

    (b) Check method numbers. There are several newer method numbers that may apply: 6010B, 7196A, 7470A, 7471A, 9010B, 9030B, 8081A, 8015B, 8270C, 8260B.

    (c) Method 8150 is specific to chlorinated acid herbicides. Are these the only herbicides to be measured?

    Response: The responses to the three subcomments are given below:

    (a) Analyses are always done for total concentration. The full analytical method for TCLP metals is 1311/6010. The number 1311 denotes the TCLP extraction procedure and the number 6010 is the analytical method for the liquid leachate. In Table II-1, if the row for the metal contains two blocks, then the second block gives the analytical method for total concentration.

    Contractual requirements specify the use of SW-846 methodology and does not specify preparation methods explicitly. Method 6010 allows solids preparation using any one of Methods 3050 (most typically used by contracting laboratories at this time). 3051, and 3052. Preparation methods are chosen by the analytical laboratory to best fit specific laboratory processes and to address specific sample issues. Specifying the preparation method to the laboratory limits options and may lead to poorer quality analytical results, which is not in the best interest of the Tri-Parties.

    (b) EPA updates their analytical methods on an unpredictable schedule. To avoid having to revise the SAP every time that EPA issues an update, the basic method number is listed in the SAP. The instructions that accompany each sample direct the analytical laboratory to use the most current EPA update.

    (c) Method 8150 is specific to chlorinated acid herbicides, which are the most likely to be present. Other pesticides, if present, are potentially captured via methods 8260 and 8270. As described in the second paragraph of the response to (a) above for metals analysis, specifying the preparation methodology for organic analyses does not lead to improved quality of results.

13. **Comment:** Table II-2, Page II-8: For Ecology, the 16 samples should not be composited but should be analyzed discretely.

    Response: The design presented in this table is for the radioactive liquid effluent waste sites which have already been remediated. The text "for the radioactive liquid effluent waste sites" was added to the title of the table. The Department of Ecology has approved this

design and its implementation in multiple decision documents over the past nine years.

14. **Comment:** Table II-3, Page II-10: Ecology samples should be analyzed without compositing.

    Response: Same as the response to Comment 13.

15. Table II-4, Page II-11: Ecology samples should be analyzed without compositing.

    Also, due to the larger variability at this site there should be more (not less) samples taken than in the shallow zone. A total of around 40 samples would be needed with this variability.

    Response: Same as the response to Comment 13.

16. **Comment:** Section II.3.4.2, Page II-14, 1st paragraph: For quick-turnaround lab analyses, it will still be necessary for the detection levels to be below the soil cleanup levels and to maintain the same level of QC. Therefore, do not delete the statement "The QC limits and detection levels will be similar to the confirmation laboratory limits/levels. Thus, this will provide for analytical comparability. The specific method ...and meaningful nondetection reporting."

    Response: The QTL is used for in-process sampling to guide excavation. It is not used for verification, so there is no need to have the same detection limit as confirmation/verification sampling as long as it is below the regulatory limit. The following text was added to the section: "QTL analysis results are not used for verification samples".

17. **Comment:** Table A-2, Page A-4: For both the shallow zone and the deep zone the cleanup criteria should be the same – they should be the most stringent of the values for the two pathways. Also, the criteria are needed for both depths. See the Ecology copy of the redline-strikeout for Appendix A.

    Response: The definition of shallow and deep zones was fixed in the ROD. This appendix describes the development of the sampling design for the radioactive liquid waste sites, which have been remediated. Direct exposure RAGs apply only to the shallow zone. Soil cleanup levels for protection of groundwater and the river apply to both the shallow zone (the soil column above 15 ft) and to the deep zone (the vadose zone below 15 ft). Table 2-7 in the RDR/RAWP shows that the RAGs for the shallow and deep zones are the most restrictive of the applicable regulatory limits. [Note: The information in Tables A-1 and A-2 was used during the 100 Area DQO for liquid effluent waste sites. To avoid inconsistency with the RDR/RAWP, these tables were removed and references to them in the SAP were replaced referencing the 100 Area RDR/RAWP. To maintain correct table numbering, Tables A-3 and A-4 were renumbered as Tables A-1 and A-2 and table callouts have been updated.]

18. **Comment:** Section A.5, Page A-5, 1st paragraph: There is a typo regarding Table I-7. There is no Table I-7. Please add the correct table number.

Response: The correct table (Table, I-2) was referenced.

19. **Comment:** Section E.4.3, Page E-6: While this wording is fairly concise, Ecology still expects that the number of samples will be sufficient considering the variability encountered. It is highly unlikely that any less than 2 samples would address the variability.

    Response: Section E pertains to the ERDF waste acceptance policies and procedures. The regulators have approved the ERDF waste acceptance criteria. Sometimes samples are taken for waste designation purposes only.

20. **Comment:** Table F-1, Page F-1: The largest "medium" site will have more subunits than the smallest "large" site, which is larger. Provide an explanation in the text for this discrepancy.

    Response: The inconsistency in the number of decision subunits between the small and medium sized sites and the large sites resulted from the DQO decision-making process. However, that inconsistency was acknowledged and agreed to by the Tri-Parties because they determined that the sampling coverage was still adequate and cost effective. An explanatory footnote was added to the table as follows: "The Tri-Parties as part of the Data Quality Objectives process, approved the decrease in sampling frequency for the large sites because they determined that the sampling coverage was adequate and cost effective."

21. **Comment:** Table G-2, Page G-1 – G-62: For many of the sites, in the contaminated/potentially-contaminated column, it is indicated that it is assumed that all contaminated soils beneath particular depths meet cleanup criteria. Any assumptions of this nature must be supported with data, on a case-by-case basis. These assumptions must be supported when discussing closure of these sites with Ecology.

    Response: Since few of the remaining sites are liquid waste sites, it is reasonable to assume that contamination does not extend below 15 ft for design purposes. However, the assumption is dealt with on a case-by-case basis in the Remaining Sites Verification Packages after remediation is completed.

22. **Comment:** Table G-2, Page G-1-G-62: Three remaining sites may be missing from the table: 126-H-1 ash pit,
    100-H-3 gas storage tank site, and 116-D-10 fuel storage basin. Please assure that these sites are on the table.

    Response: 126-H-1 is not included in any of the RODs, so it is not listed in this CERCLA document. 100-H-3 is described on page G-54. 116-D-10 is described on page G-37.

Responses to
Washington State Department of Ecology Comments on the
100 Area Remedial Action Sampling and Analysis Plan
DOE/RL-96-22, Rev. 4 Draft B
August 30, 2004

1) **Comment:** Global: Ecology previously submitted revisions on a CD in redline/strikeout form for this document. Several of the changes made to the document by Ecology were not included in this draft of the document. These omissions will be indicated in the comments to follow. Ecology requests that you incorporate the changes indicated below.

   Response: Changes agreed to by the Tri-Parties indicated below were incorporated.

2) **Comment:** Global: This document has been resubmitted in redline/strikeout form. However, many new additions to the document have not been indicated in redline form. Please explain.

   Response: Technical editing changes are not included in the redline strikeout format. For example, the table of contents was not redlined as it adds additional pages to the document. Redline and strikeout changes to Appendix G which is a large table was included the file, but the massive changes corrupted the file, therefore, the redline was removed.

3) **Comment:** Table I-1, Page I-8: Ecology's previous comment 2: "The actual groundwater protection values are needed for all non-rad COCs. Also, cite the year of the WAC 173-340 regulation. See redline-strikeout changes made on Ecology copy" was not addressed in this document. The disposition of this comment stated that this table would be made consistent with Table 2-7 of the RDR/RAWP. Table I-1 of this SAP is not consistent with Rev. 5, Table 2-7 of the RDR/RAWP. Groundwater/River protection cleanup values for lead, mercury and PCBs have been omitted from Table I-1 of the SAP. Include them in this Table I-1. They are: lead 10.2 mg/kg; mercury 0.33 mg/kg; and PCBs 0.02 mg/kg.

   Response: The missing values for lead (10.2 mg/kg), mercury (0.33 mg/kg), and PCBs (0.020 mg/kg) have been updated in the table to be consistent with Table 2-7 of the RDR/RAWP. The SAP Table I-1 was revised to be consistent with Rev. 5, Table 2-7 of the 100 Area RDR/RAWP. Additionally, the year 1996 was referenced after citing the WAC-173-340 regulation.

4) **Comment:** Table I-1, Page I-8: Footnote h is not the correct footnote for arsenic. Replace this footnote with the one agreed upon by Ecology and EPA, and add the required additional text to the document.

   Response: The footnote has been changed as agreed to which is "The cleanup value of 20 mg/kg has been agreed to by Tri-Parties project managers. The basis for the 20 mg/kg is provided in the 100 Area RDR/RAWP Section 2.1.2.1." Additionally, the following arsenic

text was agreed upon by the Tri-Parties and was added to the 100 Area RDR/RAWP as the last paragraph in Section 2.1.2.1.

"The Hanford Site background for arsenic is approximately 6.5 mg/kg, and was determined to be the cleanup level for the 100 Areas as the start of remediation. Additionally, the statewide arsenic background is approximately 7.0 mg/kg (Ecology 1994, Publication No. 94-115). However, due to the elevated concentrations of arsenic in the 100 Area surface soil because of pre-Hanford farming uses of lead arsenate pesticides (Yodel and Delistraty, 2003), the Tri-Parties agreed in May 2000 to revise the cleanup level in the 100 Areas from 6.5 mg/kg to 20 mg/kg. The 20 mg/kg cleanup level is the WAC 173-340 Method A value used for sites in the State of Washington that contain a small number of hazardous substances, and should not otherwise be used for Hanford sites."

5) **Comment:** Section 1.6, general: Biased (focused) confirmation sampling using small numbers of samples will lead to incorrect decisions about the need or lack of need for remediation. Inadequate numbers of samples will not provide adequate statistical control and will yield high rates of both false positives and false negatives.

Response: Focused sampling is developed using existing site history, process knowledge, historical data, geophysical survey data and site walk down information and can be defensibly used to locate areas of worst case contamination to sample. These sample designs are developed for lead regulator agency approval. In Section 1.6, first paragraph, the following sentence as added to clarify that the site specific work instructions are reviewed and modified as appropriate by the lead regulatory agency. "Based on lead regulatory agency review, these WIs may be modified, as appropriate, prior to approval."

The second portion of the comment concerning statistical control is only applicable for statistical sampling designs (not focused sample designs) that generate a set of data for which the results are generalized to the entire decision unit with each portion of the population having an equal probability of being sampled. It is true that inadequate numbers of samples will not provide adequate statistical control and lead to false positives and false negatives for sample designs that are developed to evaluate the population or entire decision unit from a set of samples. However, focused sampling uses a single maximum sample value to make a decision, not a set of values that have equal probability of being selected and are then statistically treated to make a decision.

6) **Comment:** Section 1.6, general: Explain how Ecology's previous comment 9 "Cite references that describe experience to date for focused sampling" was addressed.

Response: The previous comment was addressed by a revision of Appendix G of the SAP to status the remaining sites that have had confirmatory sampling performed. A review of the remaining sites evaluated using the confirmatory sampling process was performed to status the experience to date for use of focused sampling. A summary of the review of these sites is as follows:

- Seventy-one sites within 100-B, 100-C, 100-F, 100-K and the 100 IU-2 and 100-IU-6 Areas have been evaluated to date using the remaining sites process.
- Of these 71 sites, 16 sites were determined to be "no action" using historical data, geophysical data, process-knowledge, and site history information and no confirmatory sampling was performed.
- Focused sampling was used at 44 of the 71 sites; of these, 32 sites required remediation based on using the maximum concentration of the focused sample data and 12 sites were determined "no action". Focused sampling using the maximum concentration of a contaminant resulted in approximately 73% of the sites failing to meet the cleanup criteria.
- An additional eleven of the 71 sites were determined to require remediation based upon visual observations, additional information on the site history, and process knowledge, with no sampling needed.

7) **Comment:** Figure 1-7, Page I-26: The figure indicates that decisions may be made to do no remediation, without sampling. Provide in section I-6 a paragraph that describes how you will decide, for unsampled sites, that no remediation will be required. Note that this comment is similar to Ecology's previous comment 10.

Response: The eighth paragraph of section 1.6 discusses the logic for when a site can be determined to not require remediation with no confirmatory sampling. The following sentence was inserted between the 3rd and the 4th sentence of that paragraph:

"A no action decision can be made for sites if during the evaluation process it is determined that existing historical data, process knowledge, geophysical survey data, site walk down information, or a combination thereof support that remediation is not required and no further sampling is needed to support that decision."

8) **Comment:** Table II-1, Page II-4: For metals except Cr (VI) add the digestion method – is it 3050 or 3051? For pesticides give the extraction method. Is it 3540, 3541, 3545, or 3550?

Response: The higher-tier analytical methods used determine the appropriate digestion and/or extraction methods for a given analysis. It has not been a practice to identify these in SAP-level documents, as slight modifications would require revisions on a relatively frequent basis. Preparation methods are chosen by the analytical laboratory to best fit specific laboratory processes and to address specific sample issues. Specifying the preparation method to the laboratory limits options and may lead to poorer quality analytical results, which is not in the best interest of the Tri-Parties.

9) **Comment:** Table A-2, Page II-4: Ecology's previous comment 17 "For both the shallow zone and the deep zone the cleanup criteria should be the same – they should be the most stringent of the values for the two pathways. Also, the criteria are needed for both depths. See the Ecology copy of the redline-strikeout for Appendix A" appears not to be addressed. If this table is for liquid effluent sites add "for liquid effluent sites" to the table heading. If it will apply to the remaining sites use the proper cleanup levels for mercury, 0.33 mg/kg, and lead, 10.2 mg/kg, for both zones.

Response: The information in Tables A-1 and A-2 was used during the 100 Area DQO process for liquid effluent waste sites. To avoid inconsistency with the RDR/RAWP, these tables were removed and references to them in the text of the SAP were replaced referencing the 100 Area RDR/RAWP. To maintain correct table numbering, Tables A-3 and A-4 were renumbered as Tables A-1 and A-2 and table callouts were updated.

10) **Comment:** Section F.3.2, Page F-3: This section was added after Ecology's previous review of the document. Provide in this section the Work Instruction template that is cited (BHI-EE-01, 1, 1.23). This is the basis for sampling the remaining sites, and it should be at least summarized in the SAP.

Response: The following summary of the work instruction template was added to Section F.3.2.

Site-specific work instructions (WIs), or sample designs, are developed to support a no action or remedial action decision for waste sites, as required by the SAP. The WI includes a detailed description of the waste site, including location, historical background, current description, and ecological and cultural considerations. Historical data, process knowledge, geophysical survey results, site walkdown observations, and other available information (e.g., prior sampling data, if available) are used to define the sample design. The geophysical surveys indicate subsurface anomalies to better identify subsurface structure, pipes, debris, etc. From this information, a list of contaminants of potential concern are developed and the laboratory analytical methods identified for each. The information is used to determine whether focused or statistical sampling is appropriate, as well as the number and location of samples to be taken. The detailed sample design includes sampling protocols, monitoring, and quality control requirements. The sample results are then evaluated against cleanup criteria, as specified in the RDR, to lead to a no action or remedial action decision. The lead regulatory agency reviews and approves the decision.

11) **Comment:** Appendix G, Table 1, Page G-13 and G-14: Site 126-D-2 184-D coal pit was to be sampled for "undetermined organic contaminants" according to the previous draft of the document. In this draft no organic contaminants are indicated. Provide the organic contaminants of concern for this site in the table. This also applies to 126-D-1 and 190-DR clearwell tank pit.

Response: The table heading was modified to indicate that the contaminants for all sites are COPCs, per the Remaining Sites ROD. The phrase "organic contaminants" was added for the indicated sites.

Responses to
U.S. Environmental Protection Agency Comments on the
100 Area Remedial Action Sampling and Analysis Plan
DOE/RL-96-22, Rev. 4 Draft B
August 30, 2004

1) **Comment:** Page I-8, Table I-1: The footnote for arsenic is wrong. Please change this to the agreed-to language in recent discussions.

   Response: The footnote has been changed as agreed to which is "The cleanup value of 20mg/kg has been agreed to by Tri-Parties project managers. The basis for the 20 mg/kg is provided in the 100 Area RDR/RAWP Section 2.1.2.1." Additionally, the following arsenic text was agreed upon by the Tri-Parties and were added to the 100 Area RDR/RAWP as the last paragraph in Section 2.1.2.1.

   "The Hanford Site background for arsenic is approximately 6.5 mg/kg, and was determined to be the cleanup level for the 100 Areas as the start of remediation. Additionally, the statewide arsenic background is approximately 7.0 mg/kg (San Juan, 1994, Ecology Publication No. 94-115). However, due to the elevated concentrations of arsenic in the 100 Area surface soil because of pre-Hanford farming uses of lead arsenate pesticides (Yodel and Delistraty, 2003), the Tri-Parties agreed in May 2000 to revise the cleanup level in the 100 Areas from 6.5 mg/kg to 20 mg/kg. The 20 mg/kg cleanup level is the WAC 173-340 Method A value used for sites in the State of Washington that contain a small number of hazardous substances, and should not otherwise be used for Hanford sites."

2) **Comment:** Page I-13, middle paragraph: The document states "the burial grounds are distinguished by low-level dispersed contamination." This description is more representative of the liquid waste sites. The burial grounds are concentrated contamination generally in discrete units. The term low-level can also be misleading, as other waste such as pieces of TRU waste may be removed.

   Response: The sentence was revised to read, "Finally, the burial grounds are distinguished by the presence of significant quantities of heterogeneous solid waste composed of hazardous and/or radioactive constituents with less potential for contaminated environmental media such as soil."

3) **Comment:** Page I-15, last paragraph: The document should be revised to read "the general area contamination levels are deemed acceptable, but discrete hot spots are noted, these discrete hot spots may have additional excavation, and samples will be collected from the hot spots."

   Response: The statement was revised to say "the general area contamination levels are deemed acceptable, but discrete hot spots are noted, these discrete hot spots may have additional excavation, and samples will be collected from the hot spots for HPGe, x-ray fluorescence (XRF), or other analyses (contingent on the site COC list)."

4) **Comment:** Page II-1, Section II.2.4, first sentence: The document states " A summary showing analytical methods, performance parameters, data uses, and applicable detection levels for the contaminants in 100 Area liquid effluent waste site is presented in Table II-1." Where are the comparable requirements for the remaining sites? I couldn't find any. There should be.

Response: The term "liquid effluent" in the text referencing the Table was removed. The table is applicable to the remaining sites.

5) **Comment:** Page II-7, section II.3.1.1: The document should be revised to read "a site-specific sampling design (called a work instruction WI) would be developed and approved by the lead regulator prior to sampling."

Response: The text has been modified to read "a site-specific sampling design (called a work instruction WI) would be developed for approval by the lead regulatory agency prior to sampling."

6) **Comment:** Page C-3, first bullet: The document discusses the leach test from a sample at 100-BC-1 and that the results from that test can be applied to analogous sites at other 100 Area OUs. This is a bit misleading. We have agreed to not use the C-14 leach data from that test for sites at 100-K Area. Since then we have also done leach tests for chromium at other areas, and that data is used in the CVP process.

Response: The first bullet, third sentence was revised to read: "Therefore, what has been determined for materials found in the 100-BC-1 OU may be applied (with confirmation as necessary) to analogous sites at other 100 Area OUs, with concurrence of the lead regulatory agency."

Response to EPA Comments on
100 Area Remedial Action Sampling and Analysis Plan,
dated February 2004, Revision 4, Draft B Redline

1) **General Comment:** This document begins, "The purpose of this background discussion is to describe how the 100 Area past-practice waste disposal sites, excluding burial grounds, became contaminated...". As stated, this would include the 100 N Area, which in fact has a separate set of documents. As stated it also would include the remaining sites and would not be limited to liquid waste sites. Throughout, this document sometimes includes and sometimes excludes the remaining sites and non-liquid disposal sites. If the remaining sites and other non-liquid disposal sites are excluded from this document, then we need another RDR/RAWP for those sites. Is that what we want to do?

   Response: The document was revised to more clearly differentiate between the sampling and analyses processes used for the radioactive liquid waste sites and those used for the remaining sites.

2) **Comment:** It would be very helpful to have a table of the 100 Area decision documents and the associated work plan documents.

   Response: Figure I-1 was added to the document.

3) **Comment:** Page I-2, second bullet. The document states "remaining sites, which encompass a variety of sites such as miscellaneous liquid waste disposal sites, dump sites, burn pits, and debris piles." Note that many of these remaining sites are non-liquid sites.

   Response: The text was revised as follows: "...remaining sites, which encompass a variety of miscellaneous liquid and non-liquid waste disposal sites, including dump sites, burn pits, debris piles, French drains, and unplanned releases."

4) **Comment:** Page I-2, 5 lines from the end states "Inclusion of these remaining sites in this SAP thereby supercedes the existing *Sampling and Analysis Plan for the 100 Area Remaining Sites* ". Note then that this SAP includes the remaining sites. Section 1.1.8 is consistent.

   Response: The text revisions discussed in comment response No. 1 will remove the inconsistencies.

5) **Comment:** Page III-I, Page III, the field sampling plan, has the new words "for sampling radioactive liquid effluent sites" added to it. I can't find a comparable chapter for the rest of the sites that are part of this SAP.

   Response: Additional discussion specific for remaining sites has been incorporated into Section III.

6) **Comment:** Page (Actually Table) I-2. Last row. This table is for "excluded contaminants of potential concern". The COPC is identified as semivolatiles. Semivolatiles are not excluded. Only chrysene and pentachlorophenol are excluded (see justification provided in the table). The general reference to semivolatiles should be replaced with these two specific chemicals.

Response: Accept, table revised.

7) **Comment:** Under the exclusion column, it states specific sites. Does this mean it is excluded as a COPC from specific sites, but is a COPC at the rest of the sites? The justification discusses these chemicals as wood preservers. If we have sites that may have treated wood, these could be viable COPCs. Where we do suspect them, we need to use a detection limit/PQL that matches the risk-based cleanup level. If the contract-required detection limit isn't good enough, then the contract needs to change. Note that section II.5.2 states that laboratory QA/QC data shall be evaluated for adequacy to meet the requirements for RDLs. Page II-21 defines detection limit as based on the method detection limit. The contract needs to conform to the data needs rather then the other way around.

Response: The decision of whether wood preservatives, for example, are considered COCs is made on a case-by-case basis. The analytical laboratories often report results below the contract required detection limit (CRDL). The required detection limit (RDL) that is provided with each sample for analysis is selected to provide results appropriate for the cleanup levels irrespective of the CRDL.

8) **Comment:** Page I-11, last paragraph. The document states "the decision logic for developing site-specific work instructions for the remaining sites is presented in Section I.6 and the field sampling process is summarized in Part III." This is confusing because new words have been added to part III stating that it is only for sampling radioactive liquid effluent sites. This document is not consistent in which sites are included or not, and where they are addressed.

Response: The last paragraph in Section 1.4 was revised to remove the confusion and states the following. "The decision logic for developing site-specific work instructions for the remaining sites is presented in Section I.6 and the field sampling process is summarized in Part III. The quality assurance (QA) requirements applicable to radioactive liquid effluent sites and remaining sites are presented in Part II. Sampling and analysis of burial grounds is detailed in a separate SAP (DOE/RL 2001). The relationship between the RDR/RAWP (DOE/RL 2004) and various sampling and analysis documents is shown in Figure I-1. Subsequent editing of Section III has been developed to provide additional discussion for sampling of remaining sites.

9) **Comment:** Page I-11, last paragraph. The document states "The quality assurance (QA) requirements applicable to radioactive liquid effluent sites are presented in Part II. Elements of these QA requirements are also applicable to the remaining sites. These elements include..." I can't tell if the "these elements include" list is all the applicable requirements, or just some of them. The title page of Part II doesn't indicate that section doesn't apply to all the 100 Area. In short, every waste site and decision document that is covered by this document needs to be explicitly identified, and there needs to be comparable coverage/sections for all scope of the document.

Response: The text in this paragraph was revised to indicate that the QA requirements in Part II apply to radioactive liquid effluent sites and to remaining sites.

10) **Comment:** Page II-2, last sentence. The document states "The target completeness objective for this project is provided in Table II-1." I was unable to find this information in the table. If it is there, a more specific reference would be helpful.

Response: The sentence was revised to read: "The target completeness, objective for the project is 95% ."

11) **Comment:** Page II-3, table II-1. The role of this table is not clear. It gives information for some of the typical COCs but not others. The logic for which contaminants to include is not evident. For example: Tc-99 is not included. It is included in table 2-2 of the RDR/RAWP, which lists the required detection limit of 15 pCi/g. That clearly is not a good choice for a detection limit because the 15 mrem/year risk-based cleanup level is 8.5 pCi/g so we should be measuring less than that so the sum of all radionuclides will be 15 mrem/year or less. Note that the state Dept of Health detection limit for standard routine work is 0.1 pCi/g. It is not clear why the RDR/RAWP has lists of contaminants with cleanup levels (for example tables 2-1 through 2-7) but the list in Table II-1 is relatively short.

Response: The two tables (Table II-1 in SAP and Table 2-2 in the RDR/RAWP) were revised to be consistent. The DLR value for Tc-99 was revised to 1.0.

12) **Comment:** Section II. It is not clear that the list of contaminants has been expanded in this document in light of the fact that the remaining sites have been added as scope. The remaining sites included COCs that are not addressed here. The list of COCs should be expanded.

Response: The potential list of contaminants is extensive. Therefore this section has been updated to include classes of constituents (e.g., pesticides, herbicides, SVOAs, and VOAs) associated with remaining sites rather than each individual constituent. Constituent identification for individual classes for pesticides, herbicides, SVOAs and VOAs will be done on a site-specific basis using process knowledge and/or laboratory analysis of samples as discussed in the site specific work instruction.

13) **Comment:** Page II-13, section II.3.1.5. Not clear what the new words "locally-generated" mean. Is this the Tri-Cities area, or just Hanford, or just that operable unit, or just that waste site, or… To be adding these words, someone must have thought this was important so we should make it clear what these words mean.

Response: EPA waste disposal rules allow disposal of remediation waste within the site where it was generated. For purposes of 100 Area remediation "locally-generated" means rubble and other non-contaminated material from the 100 Area that may be used as backfill for excavations. This was clarified in the text that now occurs in section 3.1.2.5.

14) **Comment:** Page II-13, section 11.3.2 and II.3.3. Both of these sections regarding sampling methods, handling, and custody reference Section III, but the introduction page of section III states it is only for radioactive liquid effluent sites. Note that this section II is for all sites. This is confusing.

Response: The text in Section III was clarified as to what is appropriate to the remaining sites and what is appropriate to the radioactive liquid effluent was sties.

15) **Comment:** Page II-18 II-21 section II.5.2. It is not clear why field duplicates are not mentioned in this section. CVP-2003-00017 Rev 0 section B1.4 discusses "main, duplicate, and split sample

results" and section B1.4.2 titled "Field Duplicate Samples" is dedicated to this topic. There is a section II.5.3 in this SAP dedicated to split samples, no comparable section for duplicate samples.

Response: Field duplicates are addressed in Section II-2.4, paragraph three.

16) **Comment:** Page II-21, "detection limit". Note that this section defines detection limit as the method detection limit. Whereas the RDR/RAWP table 2-2 footnote C incorrectly sets the detection limit to the contract-required quantitation limit.

Response: The heading was changed to read "Method Detection Limit". The Required Detection Limit is correct as defined in footnote C of Table 2-2 of the RDR/RAWP. These are not intended to be collectively be referred to as "Detection Limit". As they have two very different definitions and should not be used interchangeably.

17) **Comment:** Page 11-21, section II.5.3. The document states that "Split samples will be collected at frequencies described in Part III of this SAP." This is confusing because section II apparently applies to all the types of sites under this SAP (including remaining sites) whereas III now begins with the caveat that part II (III?) is "for sampling radioactive liquid effluent sites".

Response: Section III has been revised to include discussion of sampling for the remaining sites.

18) **General Comment:** The document discusses "work instructions"? It is not clear what these are or how they differ from site specific sampling plans. EPA's understanding has been that site specific sampling plans would be provided to EPA for review and approval, and then that would be the document that guides the field work.

Response: For the remaining sites, site specific work instructions will be prepared as described in Section 1.6. The general work instructions (identified in the previous SAP revisions) were for the large radioactive liquid effluent waste sites. EPA reviews and approves the site-specific work instruction. The revisions to clarify the text were made.

19) **General Comment:** The sections on variance sampling don't appear to match what is typically done. Does this document need to be revised, or do we need to change our actions to reflect this document?

Response: The discussion on variance sampling in Section II.3 applies to the statistical sampling performed for the radioactive liquid effluent waste sites. For the remaining sites where, focused rather than statistical sampling is predominantly used to evaluate the site, variance sampling is not required because the maximum value of the sampling is used. In cases where statistical sampling is used for remaining sites, then the variance sampling, if needed to determine variability of the site, will be discussed in the site specific work instruction.

20) **Comment:** Page III-3, Tables III-2 and III-3. For the column headed "duplicates/splits", it is not clear if 5% refers to 5% duplicates and 5% splits, or 5% total for duplicates and splits combined. A table entry of "5% / 5%" would make this clearer.

Response: The requirement is 5% each for duplicates and splits. For Table III-2 and III-3, the word "each" was inserted after 5%.

21) **Comment:** Page III-3 table III-3 and page III-4 table III-4. The 5th column entry states "minimum of one per waste site". Elsewhere in the document it states that this is 5% per sampling unit, and elsewhere sampling units are defined as decision units. This multiple terminology is confusing. It should not be "per waste site".

Response: The tables are correct. The primary requirement is 5% or 1 in 20 samples. If the number of samples for a waste site is fewer than 20, then 1 duplicate sample must be taken for that waste site. For large sites with many samples, there will be multiple duplicate samples.

22) **Comment:** Page A-4, table A-2, footnote b. For Cr+6 this table references a shallow zone value of 400 mg/kg. Note that the shallow zone value from table 2-1 in the RDR/RAWP document is 2.1 mg/kg.

Response: Tables A-1 and A-2 have been removed from Appendix A because the information is in Table 2-6 of the RDR/RAWP. To maintain correct table numbering, Tables A-3 and A-4 are now Tables A-1 and A-2 and table callouts have been updated. Reference to the previous Table A-1 and A-2 was replaced with reference to Table 2-6 in the RDR/RAWP. Section A.3, item 4 has been revised to read, "The target cleanup levels are summarized in the 100 Area RDR/RAWP." Table 2-6 in the RDR/RAWP has been updated to have the correct target levels. Removing the tables from the SAP will allow for only one document, the RDR/RAWP, to require revision as changes to cleanup levels occur.

23) **Comment:** Page A-9, table A-4. This table is from 1978. We have recent cleanups with huge quantities of data. Would it be more appropriate to use the better data for this table and the related statistical calculations?

Response: The last sentence of Section A-4 was deleted and replaced with the following text: "Although the historical data were used to develop the verification sample design, it should be noted that the number of verification samples to be taken for each site is reevaluated based on post-excavation variance sampling as described in Section G.4.3 of the RDR/RAWP (DOE/RL96-17)."

24) **Comment:** Appendix C, page C-1. The first six lines of this appendix are very confusing. It is not clear why this specific discussion about 100-BC-1 can be extrapolated to the entire 100 Area.

Response: In the first bullet in Section C.1 the text that references the 100-BC-1 operable unit was removed and the sentence was revised as follows: "If worst case waste did not contain characteristic dangerous waste, then none of the liquid waste sites would contain characteristic dangerous waste."

25) **Comment:** Appendix C, section C.2, 4th line. This would be better stated "must be less than the ERDF waste acceptance criteria which includes the LDR criteria."

Response: Accept. The text changes were made.

26) **Comment:** Appendix C, section C.3, 3rd line. "EPA" should not be defined as the U.S. Department of Energy.

Response: Accept. The reference to "EPA" was removed.

27) **Comment:** Appendix C, page C-3. This appendix C is titled "Leachability of 100 Area Soils". On this last page it states that actually this wasn't about soils. The three media used for the tests were retention basin sludge, reactor coolant diversion/junction box sludge, and fine-grained bedding sand. Again, it is confusing how this data from 100-B/C for these three special case wastes has anything to do with 100 Area soil in general.

Response: The following text was added as a new first bullet in Section C.5. "The media examined in the leachability tests demonstrated the physical characteristics of 100 Area soils and are worst-case examples of materials that would be expected to be contained in 100 Area soils. It has been established that general waste forms at the 100 Area Reactor sites are analogous. Therefore, what has been determined for materials found in the 100-BC-1 OU can be applied (with confirmation as necessary) to analogous sites at other 100 Area OUs with the concurrence of the lead regulatory agency. The leachability study results are applicable to waste characterization for disposal at ERDF and are not applicable to remediation samples for cleanup verification."

28) **Comment:** Appendix D. This appendix is confusing in that it is a discussion about a specific test from one site, but this is supposed to be a general 100 Area document. If there is a reason for having this appendix as part of this document, it would be good to present that reasoning.

Response: Appendix D is an example of the procedures used in doing leach testing at the other reactor areas. The following paragraph was added as a first paragraph of this appendix. "The following discussion of a leachability study conducted on waste materials from a specific site is included as an example of leach testing subsequently performed in support of waste characterization on analogous waste forms at other 100 Area Operable Units (OUs). The information included in this appendix is considered valuable as historical information for characterization of waste materials disposed in ERDF."

Responses to EPA Comments on
Remedial Design Report/Remedial Action Work Plan
for the 100 Area
(DOE/RL-96-17, Rev. 5, Draft B)

1. General comment: EPA's comments on recent CVPs (116-K-1, 118-F-8:1, 105 F Reactor, 118-F-8:3, 105-F Fuel Basins, 100-F-10 French Drain, and 116-KW-3) and the 100 Area SAP included comments that would apply to this RDR/RAWP. Please consider those comments too them when revising this document.

   Response: The CVP comments will be considered where applicable (see general comment 2).

2. General comment: The post-drilling scenario and the basement scenario are used in some CVPs but are not identified in this document. They should be since they are used as part of the cleanup verification process.

   Response: The post-drilling and basement scenarios are only evaluated for D&D projects as required by the D&D SAP. The 100 Area RDR/RAWP does not address D&D facilities and therefore these scenarios are not included in the document. Additionally, the residential (unrestricted) land use scenario is the scenario documented in the governing ROD and was the agreed upon by the Tri-Parties.

3. Section 2.1.1: The document should be revised as follows: "If a waste site is an engineered structure, protection will be achieved by reducing concentrations of contaminants to surface zone cleanup standards to the bottom of the engineered structure, if deeper than 4.6 m (15 ft)."

   Response: The statement has been modified to the following – "If a waste site is an engineered structure, protection will be achieved by reducing concentrations of contaminants within the shallow zone (i.e., surface to 4.6 m [15 ft] deep) to shallow zone cleanup standards (direct exposure, groundwater protection, and river protection RAGs are applicable to soils within 4.6 m (15 ft) of the ground surface) and by reducing concentrations of contaminants within the deep zone (i.e., greater than 4.6 m (15 ft) below the ground surface) to deep zone cleanup standards (groundwater protection and river protection RAGs are applicable to soils greater than 4.6 m (15 ft) below the ground surface)."

4. Section 2.1.1: The document should be revised as follows: "providing institutional controls, as required ~~in the event that DOE relinquishes the site~~." Institutional control requirements apply during and after DOE control of the site.

   Response: Comment accepted.

5. Section 2.1.1: The document should be revised as follows: "The Interim Action ROD also indicates that for establishing numerical remedial action goals (RAGs)

protective of human health, the RAOs will be met by using the residential exposure scenario." ~~Removal of soil and debris exceeding human health based goals and replacement (i.e., backfilling) with clean material also will meet the objective of protection of ecological receptors.~~

Note that the cleanup level for chromium is more restrictive for ecological protection than for human health protection.

Response: The statement "Removal of soil and debris exceeding human health based goals and replacement (i.e., backfilling) with clean material also will meet the objective of protection of ecological receptors" is a true statement under the 100 Area interim records of decision and should not be removed. Cleanup levels for ecological protection were not in effect at the time of the Records of Decision (RODs) (EPA 1995, 1997, 1999, 2000) that govern cleanup of the 100 Area waste sites. The August 2001 changes to the *Model Toxics Control Act* Cleanup Regulation, Washington Administrative Code 173-340, which includes soil cleanup levels protective of ecological receptors, are not applicable or relevant and appropriate requirements in the current RODs.

6. 2.1.2.5, 4th paragraph: The document should be revised as follows: "As appropriate, dilution factors ~~greater~~ other than 1:1 will be evaluated on a constituent-specific basis using Hanford Site data."

   Response: Comment accepted.

7. Section 3.4: The following sentence should be removed: "~~Documents are prepared by project staff and are reviewed by ERC functional groups.~~"

   Response: Comment accepted.

8. Table 2-1, arsenic: The site Hanford site-specific background concentration should not change. The correct value is 6.5 mg/kg.

   Response: Comment accepted.

9. Table 2-1, arsenic: Footnote d needs to change. The statewide arsenic value is not 20 mg/kg. The statewide arsenic level is 5-9 mg/kg. (www.ecy.wa.gov/programs/tcp/area_wide/Final-Report/PDF/TF-Report-final.pdf page ii). It would be good to double-check the reference to "table 2 of WAC 173-340-740)". My version of WAC 173-340-740 doesn't have a table 2. My version does have a table 740-1 "Method A Soil Cleanup Levels for Unrestricted Land Uses" in section 173-340-900. Perhaps footnote d could be rewritten as "The method A cleanup level for arsenic of 20 mg/kg has been adopted (WAC 173-340-900 table 740-1)."

Response: The footnote was revised to state "The cleanup level of 20 mg/kg has been agreed to by the Tri-Parties project managers." The comment cites a version of WAC 173-340 that was not in effect at the time of the Records of Decision (EPA 1995, 1997, 1999, 2000) that govern cleanup of the 100 Area waste sites.

10. Table 2-2. Technetium-99: The value selected for remedial action goal should be 8.5 pCi/g, not 15 pCi/g. The required detection limit should be substantially less than 8.5 pCi/g so we can quantify the amount of radionuclides so that total dose from all radionuclides is no more than 15 mrem above background. Note that the Washington State Department of Health uses a detection limit of 0.2 pCi/g for routine analysis of soil.

    Response: Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs (*Washington Administrative Code* [WAC] 173-340-707[2]). A Tc-99 RDL of 1 pci/g will be contractually defined with the laboratory. This will adequately address an 8.5 pCi/g action level.

11. Table 2-5: A RDL that is not sufficiently sensitive to quantify the contaminant to the ARAR/risk-based cleanup number means the RDL must change, not the cleanup level. For example, footnote k and associated numbers should be fixed.

    Response: For Tc-99, a lower RDL has been negotiated with the laboratories. The lookup values for C-14 and Tc-99 will be revised to equal the lookup values calculated by RESRAD. Footnote f will revised to read; "Contractual required detection limits are set at a nominal 1 pCi/g for these isotopes. Actual sample detection limits are expected to be below this value for routine soil analyses. It is expected that the presence of anlaytes greater than the lookup values will be detected and reported for most samples."

    For the chemical analyses, footnote g will be revised to; "Where cleanup levels are less than practical quantitation limits of the best available analytical methodology, cleanup levels default to the practical quantitation limits (Washington Administrative Code [WAC] 173-340-745[6][c]) (1996). Laboratory contractual RDLs are equivalent to practical quantitation limits for these analytes. Periodic review will be performed to determine if alternate or improved methodology has been developed yielding lower analytical detection limits." The sulfate values have been corrected in the tables. The original k footnote is not needed in this table and has been deleted, however a new footnote was added which caused the previous j to become k. Similar corrections will also be made in Table 2-6.

12. Table 2-6, river protection goal for Cs-137: EPA wasn't able to find the source for the river protection remedial action goal of 60 pCi/L. This doesn't need to be added to the document, but in response to this comment, please provide the reference.

    Response: A similar comment was provided by Dick Jaquish in the past on a previous version of the RDR/RAWP. In a telephone call on Friday, October 12,

2001, Dick Jaquish stated that he had done the calculation and agreed that the MCL for cesium-137 in Tables 2-3 and 2-4 of Rev. 3 of the100 Area RDR should be 60 pCi/L and the target organ is the liver.

13. Table 2-7: A RDL that is not sufficiently sensitive to quantify the contaminant to the ARAR/risk-based cleanup number means the RDL must change, not the cleanup level. For example, footnote d and associated numbers should be fixed.

    Response: The soil cleanup levels protective of groundwater and the river are based on the 100 times rules and are more arbitrary than risk-based. Where cleanup levels are less than background or RDLs, cleanup levels default to background or RDLs (*Washington Administrative Code* [WAC] 173-340-707[2]). See response to comment 11. Table 2-7 will be revised consistent with the changes to be made in table 2-5 (and table 2-6).

14. Section 3.4.5 and 3.4.6: The document states "Lead regulatory agency shall provide documented notice to DOE within three working days, if approval is warranted." This should be changed to something like "...within a timely manner if approval is warranted". Three days will often be sufficient, but there are times that the cognizant person is not available for the three day period.

    Response: The sentence was revised to state "Lead regulatory agency shall be provide notice to RL within a timely manner if approval is warranted."

15. Section 3.6.1, 2nd last sentence: The document should be modified something like the following: "These units will be identified in site-specific work instructions prepared for confirmation sampling which are submitted to the lead regulator for review and approval. "

    Response: Comment accepted.

16. Section 3.6.5: Is this a good section to explain how duplicates and split samples will be used? I.e. in addition to their role in the QA/QC process, which value(s) are used in comparison to cleanup requirements?

    Response: The explanation of the duplicate and split use is included in Appendix G. Section G.5.1 explains the duplicate and split use for data quality assessment. Section G.5.2.1 and Figure G-1 explain the use of the duplicate in the 95% UCL calculation. To provide additional clarity for the use of the duplicate in the three-part-test, the following has been added at the end of the first paragraph of Section G.6.4.

    "The duplicate sample is treated as a separate sample for the three-part-test. The split sample is only used for DQA purposes and is not included in the three-part-test."

17. Section 3.6.6, 2nd paragraph: Consumption of water (based on leaching from the residual contamination in the soil) should be identified as part of the scenario. (See for example appendix section B.4 and table B-1.)

    Response: The drinking water pathway is included in the third sentence of the second paragraph of Section 3.6.6 as one of the pathways evaluated in using a dose assessment model to determine that remedial action has achieved the cleanup level of 15 mrem/yr above background. Stating that drinking water is obtained from groundwater that receives leachate from residual contamination in the soil seems redundant.

18. Figure 3-1: Regulator review and approval needs to be added to work instructions. Also the process for requirements flowing into the institutional control plan need to be identified.

    Response: The work instructions identified in Figure 3-1 are for field site support systems, not the site specific sample designs prepared for the remaining sites. For clarification, in Figure 3-1 site specific work instructions will be added to the Sampling and Analysis Plan process line. It will note that regulatory agency review and approval is required.

    The *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions* (DOE-RL 2001) requires submittal of a sitewide institutional controls report to EPA and Ecology by September 30 each year thereafter. The process is explained in Section 3.8, but is not listed in Figure 3-1, as this figure is just an overview. However, to clarify the reporting process, the fourth bullet in Section 3.8 will be revised to state, "Evaluation of the implementation and effectiveness of institutional controls on an annual basis with a report issued each year to EPA and Ecology by September 30.

19. Figure 3-3: There's a typo in the footnotes. The second footnote e should be g.

    Response: Comment accepted.

20. Figure 3-5: Use of groundwater is not depicted on this scenario. It should be added.

    Response: Groundwater was added to Figure 3-5.

21. Section 4.1.1, 1st paragraph: This paragraph about contaminated solid waste and demolition debris contains a new statement: "On a case-by-case basis, and as allowed by the lead regulatory agency, such waste forms may be used as waste site backfill..." Material, be it soil, solid waste, or demolition debris that does not meet cleanup standards is not allowed to be placed back in the hole. Material that meets cleanup levels may be put back into the hole. That is how we have always managed this waste. The new sentences that were added to the middle of this paragraph should be removed.

Response: These two new sentences were deleted from the 1st paragraph, but will be inserted in the 3rd paragraph after the 2nd sentence.

22. Section 4.5.1: The document should be revised to read "such as RCRA provisions for management of hazardous waste."

    Response: Comment accepted.

23. Section 4.5.1, last sentence: The document should be revised to read "These drawings will be provided to the lead regulatory agency for review and approval."

    Response: The last sentence was revised to read "these drawings will be provided to the lead regulatory agency for review and approval as requested."

24. Section B.2: The phrase "and EPA proposed radionuclide soil cleanup standard of 15 mrem/yr above background (EPA 1994a)" should be removed.

    Response: The last sentence of Section B.2 will be changed to read "The RESRAD model has been accepted by the U.S. Environmental Protection Agency (EPA) and the U.S. Nuclear Regulatory Commission (NRC) for performing dose assessments to support radionuclide soil cleanup standards."

25. Section B.6, 1st paragraph and item #1: It is confusing how this correlates to figure C-1. This section states: "The general process will be to first determine the nature and extent of residual contamination (concentrations and thickness of contaminated zones[s])...The specific process...will follow a hierarchy as shown by these steps: 1. Assume worse case. Concentrations of residual contamination are uniform from the bottom of the excavation to groundwater." Note that nowhere in this hierarchy of section B.6 is the 50-50 model mentioned. In contrast, figure C-1, the generic site model, shows the top 50% of the remaining vadose zone is contaminated and the bottom 50% is clean. This is confusing.

    Response: Section B.6 does not relate to Figure C-1. Figure C-1 depicts the generic site model that is used in the discussion of development of lookup values in Section B.5. Section B.6 discusses evaluation of the nature and extent of contamination using site-specific contamination concentrations and contaminated zone and vadose zone thicknesses.

26. Table 2-6, Section E.5 and table E-1. K_d for carbon-14: This revision to the document changes the K_d for carbon-14 to 200. The basis is a leach study in 100-F which according to this document states "that carbon-14 in the soil does not leach." I think we have actual field data that invalidates that conclusion. For example, there is a highly concentrated carbon-14 plume down gradient from the carbon-14 contaminated condensate crib by the 100 KE reactor. If carbon-14 really had a K_d of

200, there would not be a groundwater plume. Note that was a very low volume liquid discharge site, so the carbon-14 has moved without much of a liquid driver.

Response: It should be noted that the change of the Kd for carbon-14 to 200 occurred in the previous version (Rev. 4) of the 100 Area RDR/RAWP. The second sentence "carbon-14" paragraph was revised to say that carbon-14 was not detected in the leachate. Additionally, the sentence "Based on the 100 Area leach study results a k_d value of 200 was selected for carbon-14, except for the 100-K Area, where a site specific value will be established prior to closeout of the waste sites" will be added to the end of the carbon-14 paragraph."

27. Section E.6, 1st sentence: The document should be revised to read: "The regulatory agencies allow for the development of use of site-specific values."

    Response: It is believed that the commenter meant Section E.5, as Section E.6 is the "Reference section". The sentence was added to Section E.5.

28. Section F needs to be reviewed and updated. For example:
    * F.3.1, 3rd bullet. There is a very dated statement that could be removed: "tour held March 15, 1996; additional presentations to be scheduled)."
    * There are multiple references to the "Hanford Reach" newspaper that has been discontinued.

    Response: Section F was updated, as applicable.

29. Appendix G. Cleanup verification packages: In light of the most recent comments on CVPs including the streamlined CVP, it would be good to update this appendix accordingly.

    Response: The primary CVP comments related to the RDR include comments on the post-drilling and basement D&D scenarios. The post-drilling and basement scenarios are used for D&D CVPs (see general comment 2). As for the streamlined CVP, final resolution of a Streamlined CVP is pending. When a streamlined CVP is approved, the appropriate changes will be made.

Response to Ecology Comments on
Remedial Design Report/Remedial Action Work Plan
for the 100 Area (DOE/RL-96-17, Rev. 5, Draft B)

General

1. **Comment:** The year of WAC 173-340 must be added each time this regulation is cited. The citations in this document are generally not accurate when applied to the new regulation. Several specific comments about this are given below.

   Response: References to WAC citations include the appropriate citation and year.

Specific Comments:

1. **Comment,** Section 1.3, page 1-2: Tables 1-1 through 1-6 were removed since the last revision. This section should indicate their removal with strikeouts. Please provide an explanation for removing these tables.

   Response: Tables 1-2 through 1-6 identified the waste sites per specific record of decisions, and then included their projected contamination volume. Appendix A of the RDR/RAWP, provides the same information. Appendix A provides additional information, such as the reference to the closeout verification packages, which include all the specifics (i.e., contaminated volume removed) to the respective waste site. Therefore, it was decided to remove the tables.

2. **Comment,** Section 2.1.1, page 2-1, RAO 1, 1st paragraph: The statement previously at the end of this paragraph stated that 10 CFR 20 has been withdrawn and no longer applies. This statement should be present here and indicated with a strikeout. Does 10 CFR 20 apply?

   Response: The statement previously at the end of this paragraph should have remained at the end of this paragraph. The sentence "The draft U.S. Nuclear Regulatory Commission regulation (10 CFR 20) was withdrawn and is no longer applicable" was inserted at the end of this paragraph.

3. **Comment,** Section 2.1.1, p. 2-1, RAO 1, top of page: Please add the year associated with the WAC 173-340 regulation. WAC 173-340-740[6][c] is now (in the 2001 regulation) specific to soil cleanup for protection from vapors.

   Response: References to WAC citations include the appropriate citation and year.

4. **Comment,** Section 2.1.2, page 2-3, first bullet: Add the following statement to this bullet: WAC 173-340, 1996, is currently the basis for nonradionuclide constituent (including uranium metal) cleanup levels, since the interim action RODs predate WAC 173-340, 2001.

Response: Comment accepted with modifications: "WAC 173-340, 1996, is currently the basis of the RAGs for nonradionuclide constituents since the interim action RODs predate WAC 173-340, 2001."

5. **Comment,** Section 2.1.2.1, p. 2-4, 1st paragraph in section: WAC 173-340-705 describes use of Method B. It does not specify actual cleanup levels as implied. Again, give the year of WAC 173-340 and correct this statement by replacing the word "specifies" with "describes".

   Response: The second sentence of the paragraph was modified to say "Method B (WAC 173-340-705, 1996) specifies cleanup levels for....". Also, footnote 1 was corrected to say 3.7-m (12-ft), not "37-m."

6. **Comment,** Section 2.1.2.3, page 2-7, 1st paragraph: WAC 173-340-720(3) is now Method A groundwater cleanup levels. Please add the year to the citation of the WAC 173-340.

   Response: The citation WAC 173-340-720(3), 1996, was added.

7. **Comment,** Section 3.4.5 page 3-12, 3rd bullet and Section 3.4.6, page 3-13, 3rd bullet: Please change the second sentence in each bullet to the following: If additional review time is necessary the review time can be increased up to a total of 45 days. This is consistent with the TPA.

   Response: The 2nd and 3rd bullets in both sections were revised to state: 2nd Bullet "Lead regulatory agency shall provide notice to RL within a timely manner if approval is warranted." 3rd Bullet "Lead regulatory agency review period is generally two weeks. If additional review time is necessary, the review period can be increased up to 45 calendar days. To minimize impacts to the schedule, additional review time should be communicated early in the process."

8. **Comment,** Section 3.6, page 3-16, 2nd paragraph: Please strike the last sentence of this paragraph. Ecology will look at confirmatory sampling schemes for candidate sites on a site-by-site basis.

   Response: The 2nd paragraph was rewritten to clarify the remaining sites sampling strategy, and that the sample designs are on a site-specific basis with regulator review and approval.

9. **Comment,** Section 3.6.1, page 3-17, 2nd paragraph of section: Please change this paragraph back to how it used to be. The changes that have been made to this paragraph are not acceptable. Sampling should be more rigorous for sites that will not be remediated, and sampling should ensure that sufficient samples are taken to confirm that the site will not pose a hazard if left in place.

   Response: This section was revised to better explain the remaining sites site-specific sampling process, and is consistent with the SAP.

10. **Comment,** Section 3.6.1, page 3-17, 2nd paragraph of section and Section 3.6.7: Please indicate that decision rules are discussed in section 3.6.5, rather than 3.6.4.

    Response: Comment accepted.

11. **Comment,** Figure 3-3, page 3-29: Please add footnote g (or correct the second footnote e).

    Response: The footnotes on Figure 3-3 were corrected

12. **Comment,** Appendix D, page D-3: The equation at the bottom of the page relating concentration in groundwater with time and half-life is not appropriate for inorganic chemicals (nonrads). They have a decay half-life of infinity. Setting half-life to infinity would make $T/(t_{1/2})$ approach zero. If this equation must be used for inorganic chemicals, set their half-lives to infinity.

    Response: The approach of using surrogate radionuclides for RESRAD to evaluate nonradionuclides for protection has been agreed to by the Tri-Parties, and has been implemented in the cleanup verification process for the waste sites.

    Note: During the comment resolution meeting it was agreed to provide Ecology with the documentation supporting this approach. The documentation was submitted by e-mail on May 17, 2004.